

NASA TECH BRIEF

Manned Spacecraft Center



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Hydraulic Expansion Process Shapes Large Metal Sheets

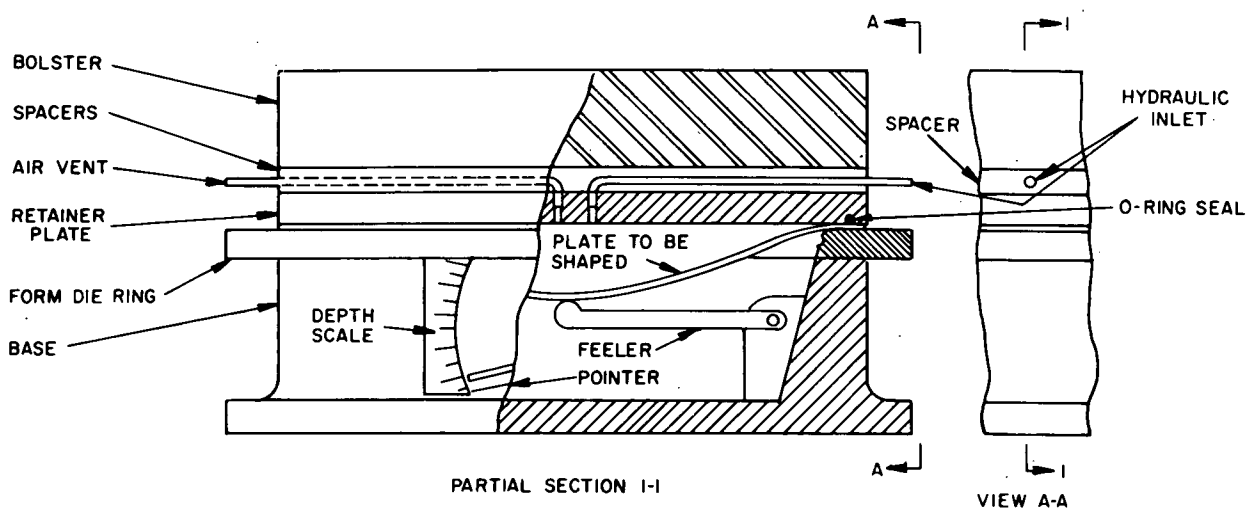


Figure 1.

A novel and economic hydraulic expansion process has been developed to shape large metal sheets. Although the process was designed specifically to impart a dome shape to titanium sheets it may be used to shape other metals. Specifically therefore, it will be of interest to automobile and aircraft body manufacturers.

Figure 1 illustrates the expanding die fixture used in the process. This fixture includes a base and a form die ring supported on the base. The sheet of metal to be shaped is placed on the die ring and covered by a retainer plate. An O-ring, which encircles the edge of the retainer plate, seals the space between the retainer and the metal sheet which is to be shaped. A hydraulic inlet tube and an air vent tube lead through the retainer plate to the sealed space; a bolster or the platen of a

press, holds down the retainer plate. Spacers in both sides of the tubes, and between the bolster and the retainer plate provide a passageway for the tubing. Pressure on the metal sheet applied by the hydraulic fluid then deforms it. The extent of the deformation at the center of the plate is sensed throughout the forming process and the depth of the central bulge is transmitted mechanically to a pointer and dial.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Manned Spacecraft Center, Code JM7
Houston, Texas 77058
Reference: B71-10511

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

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